

A.I.D. EVALUATION SUMMARY PART I

A. REPORTING A.I.D. UNIT
USAID/Rabat

B. WAS EVALUATION SCHEDULED IN
CURRENT FY ANNUAL EVALUATION PLAN?

C. EVALUATION TIMING
yes X slipped ad hoc
interim final X
ex post other

B. ACTIVITY OR ACTIVITIES EVALUATED (List the following information for project(s) or program(s) evaluated If not applicable, list title and data of the evaluation report)

Project #	Project/Program Title (or title & date of evaluation report)	First PROAG or equivalent (FY)	Most recent PACD (mo/yr)	Planned LOP Cost ('000)	Amount obligated to
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608-0196	Locust Control Project FY 1988		6/92	\$23,500	*\$13,500 ,
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* 6,397 million deobligated on 4/30/92

E. ACTION DECISIONS APPROVED BY MISSION OR AID/W
OFFICE DIRECTOR

1. USAID/Rabat to recommend that AID/W study the feasibility of applying the Morocco institutional and organizational structure for locust control in other, similar locust control efforts;
2. USAID/Rabat to encourage the GOM to establish a panel of representatives from concerned national and international institutions to develop a long-term, national pesticide management plan;
3. USAID/Rabat to support the continued availability of key items such as greenness maps and cholinesterase kits.

Name of action
officer:

1. C. Uphaus
2. "
3. "

Date Action to be
completed:

1. 3/31/94
2. 3/31/94
3. as needed

F. DATE OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION:
MO 5 DAY YR 92

Report Date:
3/92

G. APPROVALS OF EVALUATION SUMMARY AND ACTION DECISIONS:

Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Officer
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Signature: Charles Uphaus

Typed name: Charles Uphaus

Rachid Lakhdar
DPVCTRF

E. Amundson

Martin V. Dagata
Director

Date: 2/25/94

H. EVALUATION ABSTRACT

The Project evolved from the locust invasion in October 1987, at which time USAID invoked emergency relief through OFDA. A second invasion also required OFDA emergency relief, and it appeared that locusts would continue to pose a serious threat to Moroccan agriculture over an extended period. In order to provide a mechanism for longer-term assistance, the Moroccan Locust Control Project (MLCP) was approved May 11, 1988 with initial funding of \$3.5 million and a PACD of Sept. 30, 1990. Based on the likelihood of a continued threat through early CY 1991, the MLCP was amended on February 10, 1989 to increase the total budget to \$23.5 million, and to extend the completion date through June 1991. A continuing locust threat did not, however, develop; of the Project's total budget, only \$5.7 million was expended. Due to the hiatus of USAID activities in Morocco during the Gulf War, USAID extended the PACD to June 30, 1992, in order to ensure the adequate close-out of Project activities, particularly those related to environmental monitoring.

The evaluation was conducted by a five-person contract team with expertise in project evaluation, entomology, pesticide management, operations/aerial applications and environment/health. The evaluation methodology consisted of document reviews, field investigations in Morocco and interviews with U.S., Moroccan and international organizations. The evaluation report addressed six principal areas: Project history and description; the organizational structure; survey and control strategies; operations and pesticide application issues; pesticide management and disposal; and human health and the environment. Other areas addressed in the evaluation report include USAID's responsiveness to the problem, human resource development, regional cooperation, the validity of economic assumptions in the Project Paper, and the cost of the locust control program.

The findings, conclusions and recommendations of the team are presented in Section J. below. The principal finding, however, is that **the Project was highly successful in protecting Moroccan crops and livestock in a safe manner, and is to be commended as to its quality and effectiveness.** Despite initial concerns, no significant damage to crops and livestock occurred, and no reports of serious harm to human health or the environment were registered. The Project fully attained its four major outputs: enhanced capacity to control DL through aerial spraying, improved strategic planning and tactics of control, improved efficiency of operations, and improved GOM capacity for the management and monitoring of environmental, safety and health aspects of control operations. The team accorded AID (both USAID/Morocco and AID/W) high marks for responsiveness, and reported that Moroccan officials had a very positive view of USAID's contribution and the Agency's overall responsiveness. The team was most impressed with the GOM's locust control organizational structure, which it found to be comprehensive, well-coordinated and disciplined, noting that the Moroccan expertise constituted a valuable regional resource and that the organizational structure could serve as a model for other efforts. The team also highlighted the fact that an important result of the MLCP is a heightened environmental awareness at all levels of the Moroccan Government. One related special concern raised by the team was that of pesticide management and disposal. The report presents options for dealing with these residual pesticides.

In terms of the economics of the MLCP, the team found it difficult to calculate accurate per ha. costs, but estimated that total costs were in the range of \$19-\$20 per ha. Even more difficult was the estimation of Project benefits. The report notes that the figures and assumptions in the PP economic analysis were highly problematic, but also concludes that, based on the fact that agricultural production in southern Morocco actually **increased** during the DL invasion, significant losses were avoided and significant economic benefits realized. (The value of agricultural production in S. Morocco in 1988/89 totaled roughly \$100 million.)

Since this was a final evaluation, recommendations for follow-up GOM and AID actions are of a more general program, rather than project-specific, nature, and are oriented toward effectively coping with possible future incidences of desert locust invasion. For AID worldwide, it was recommended that prior to undertaking DL control programs in other nations, the feasibility of applying the institutional structure developed in Morocco as a model be thoroughly studied. Given the severity of the pesticide storage and disposal problem in Morocco, the team recommended strongly that USAID/Morocco encourage the GOM to establish a panel of representatives from concerned national and international institutions to develop a long-term, national, pesticide management plan.

H. EVALUATION ABSTRACT (continued)

Further recommendations for USAID/Morocco action include encouragement and assistance for the GOM in developing a sustained capacity to monitor and control desert locusts, perhaps through periodic workshops and training exercises to assure the transfer of experience from trained personnel to new recruits. Specific areas in which USAID itself should provide training include pesticide management and environmental monitoring. Finally, USAID/Morocco should assure the continued availability of key items such as greenness maps and cholinesterase kits for use in current monitoring programs and future control efforts.

For the GOM, since there is no current DL threat, and in order to release resources which were diverted to the locust control effort for their more traditional uses, the NLCC should revert to the administrative oversight of MARA; the Center's important vehicle, equipment and material stocks could be directed to more immediate needs within the agricultural sector. Further, climate-specific protective gear for pesticide handlers should be developed, perhaps through FAO programs such as the Inter-Regional Preventive Control Project. Finally, given Morocco's experience and capabilities, donors should consider establishing a regional locust control training center in Morocco specialized in the locust/grasshopper , domain, which could serve both national locust control personnel as well as those from neighboring countries.

Lessons learned through the MLCP include the following: the successful monitoring and control of desert locusts requires a regional approach and cooperation amongst all concerned countries; the GOM organizational structure could serve as a model for similar programs; pesticides should be ordered on an as-needed basis to the extent possible; large aircraft use in large, unpopulated and non-agricultural areas is effective and should be considered for future operations; and, cholinesterase kits are a cost effective way for significantly improving the safety of the spray operations, as well as improving individual appreciation for health and environmental concerns.

I. EVALUATION COSTS

1. Evaluation Team

Name	Affiliation	Contract Number <u>OR</u> TDY Person Days (US\$)	Contract-Cost <u>OR</u> TDY Cost (US\$)	Source of Funds Project
Habib Khoury	Winrock International	PDC-1406-I-00-0032-00	\$90,618	(608-0196)
Geroge Cavin	"			
Wolfgang Muller	"			
Ellis Huddleston	"			
Carrol Voss	"			

2. Mission/Office Professional

- Staff Person Days (estimate) 15

3. Borrower/Grantee Professional

Staff Person-Days (estimate) 75

J. SUMMARY OF EVALUATION FINDINGS, ORGANIZATIONS AND RECOMMENDATIONS

Address the following items:

- Name of mission or office
- Purpose of activity(ies) evaluated
- Purpose of the Evaluation and Methodology Used
- Findings and Conclusions
- Recommendations
- Lessons learned

Purpose of Activities Evaluated: The purpose of the Project was to protect Moroccan agricultural and livestock production from the locust plague in ways consistent with protecting the health and well-being of the people and the environment. The more specific project purpose was to assist the GOM, in coordination with other donors, to control the Desert Locust invasion. Due to increased locust activity and expectations of ongoing serious threat to Moroccan agriculture, the Project was amended in March 1989 to provide additional support to this effort.

Purpose of Evaluation and Methodology used: This is the final evaluation of the Morocco Locust Control Project. The overall objectives of this evaluation were to assess: a) USAID's response to the GOM's call for emergency assistance; b) overall project achievements; and c) lessons learned. Specifically, the evaluation examined: 1) the effectiveness of the Project in meeting the output-level objectives; 2) the Project's progress in meeting its goal-level objectives; 3) the effectiveness of the Project in meeting purpose-level objectives; and 4) spin off activities.

The evaluation was carried out by a five-person contract team of three Americans, one German and one Canadian with expertise in entomology, pesticide management, aerial application and environmental/health issues. The evaluation methodology was designed to evaluate the Morocco locust control program as a whole and, specifically, the assistance provided by USAID. The methodology consisted of the review of pertinent documentation, interviews with involved parties, and field visits to program sites. The team interviewed USAID officers, representatives of the Gendarmerie Royale, Ministry of Agriculture and Agrarian Reform, Ministry of Interior, Ministry of Public Health, Ministry of Transport, FAO, and the National Laboratory for Analyses and Chemical Research.

Principal Findings and Conclusions:

- The Project was highly successful in protecting Moroccan crops and livestock in an environmentally safe manner.
- Through donor assistance, the GOM registered an increase in overall control capabilities; the maintenance of personnel, equipment and material stocks has allowed the GOM to maintain an effective aerial treatment capability of 20,000 - 30,000 hectares per day.
- The GOM's capacity for survey, treatment and communications increased dramatically as the campaigns progressed; the GOM is well positioned to undertake similar future campaigns.
- Much of Morocco's improved capability to plan and execute a control strategy may be attributed to the national organization that was developed--a structure which may be described as functional, comprehensive and well-adapted to Moroccan conditions.
- The success of future monitoring and control efforts will depend not only on Morocco's internal level of preparation, but also on its success at working with neighboring countries on the development of collaborative detection and control strategies.
- The GOM should reevaluate its decision to rely on the use of DDVP, a pesticide, for control operations and to import vehicles, equipment and material stocks for the sole use of future campaigns. Instead, resources diverted to the locust control effort should be released for other uses; pesticide materials, in particular, should only be ordered on an "as-needed" basis.
- USAID made a significant public health contribution through the provision of protective clothing, cholinesterase test kits, and training in cholinesterase testing. These contributions reduced the number of insecticide poisoning incidents from over 400 persons during the first campaign in 1988 to 23 persons during the second campaign in 1989.
- Project activities resulted in significantly heightened environmental awareness throughout the GOM.

J. SUMMARY (continued)

Other Areas of Concern:

- **Pesticide Management and Disposal:** Pesticide surplus disposal is a serious problem in Morocco, and there exists a strong political desire to find a solution. The GOM is making great efforts in this area and has proposed two new projects to be financed from national funds. Nonetheless, a great deal of work remains to be done and, given USAID's experience in the area, the Agency should assist the GOM in further articulating its strategies.

- **USAID Responsiveness:** Moroccan officials generally had a very positive view of USAID's contribution and the Agency's overall responsiveness to their requests. They expressed gratitude to USAID for its contribution, specifically referring to the Agency's role in providing commodities and treatment aircraft, its leadership in environmental and health safety, and its assistance in organizational and human resource development. Reservations were, however, raised with regard to pesticide selection (i.e., the Agency's refusal to supply or support the use of DDVP), as well as uncertainty with respect to AID's commitment to future activities such as pesticide storage and disposal.

- **Regional Cooperation:** Learning from the latest locust invasions, Morocco has activated cooperation with neighboring countries. Presently, Moroccan teams are participating with Mauritanian counterparts in surveying locust breeding zones in northern Mauritania through the Maghrebien Intervention Force (FMI). Also, Moroccan officials expressed their interest in participating in the FAO Inter-Regional Preventive Control Project which was in the preparation stage at the time of the evaluation.

- **Economic Assumptions:** A brief review of some economic analyses indicated the use of different figures for locusts control cost per ha. by the FAO, USAID and the GOM. While Morocco used the overall figure of \$15.36 after the 1988 campaign, it was reduced to \$10.00 after completion of control operations in 1989. Morocco considers in the calculation the depreciation value of non-expendable items over time and the personnel travel costs, but it does not include salaries and benefits. Accurate per ha. cost of the locust control campaign is very difficult to calculate, though the team did provide a "ballpark" estimate of between \$19 and \$20 per ha. Benefits were also difficult to calculate, but were judged to be significant in view of the fact that agricultural production, rather than decreasing, actually increased during the years of maximum locust threat.

"Lessons Learned":

- The successful monitoring and control of desert locusts requires a regional approach and cooperation amongst all concerned countries; efforts to increase such cooperation should be strongly encouraged.
- The national organization that was developed specifically for locust control proved functional and responsive, and could serve as a model for other similar programs.
- Given the environmental hazard posed by unused pesticide stocks, plus the cost of their storage and disposal, countries "under attack" should order pesticides on an "as-needed" basis to the extent possible. Furthermore, a detailed pesticide management plan must be a part of any future projects in which pesticides are provided.
- While spraying with large aircraft is sometimes considered as posing too great a risk to the environment and human health, these aircraft proved effective and efficient for use in large, unpopulated and non-agricultural areas; they should be considered for future operations.
- The provision of cholinesterase kits is a cost-effective way for significantly improving the safety of the spray operations, as well as improving individual appreciation for health and environmental concerns. Such kits, and the provision of training to assure their appropriate use, should become integral components of future DL control programs.

K. ATTACHMENTS: Evaluation Report

L. COMMENTS BY MISSION, AID/W AND BORROWER/GRANTEE

Mission Comments: USAID/Rabat finds the evaluation to be thorough and accurate, and we suggest that it be widely distributed both within and outside the Agency. We especially wish to underscore the following points made by the evaluation team:

- The report correctly credits the Government of Morocco with responding quickly and effectively to the desert locust threat;
- The "military" command/control structure used in the Morocco case represents a good model for future activities of this sort with pronounced "military campaign" characteristics;
- The achievements of the Project went far beyond simply "killing the bugs", and include a significantly heightened appreciation on the part of the GOM and the public of the environmental and public health issues associated with large-scale pest control efforts;
- The dangers associated with maintaining excess pesticide stocks are graphically evident in the case of Morocco, and every effort should be made to limit pesticide procurement to a strictly "as needed" basis.

GOM Comments:

- The GOM objects to the use of the term "Western Sahara", which should be corrected to read "Moroccan Sahara".
- The report criticizes the GOM (section 5.1.2 of the report) for having utilized the insecticide DDVP during the invasion. However, it should be noted that DDVP was only used in the most serious cases against enormous swarms, due to the higher immediate impact of the product. Further, it was only used over uninhabited desert regions.
- To clarify statements in para 4.2.3 of the evaluation report, the USAID-recommended treatment against hoppers ("barrier strips" using the chemical carbaryl) was not used because tests conducted in the field did not show satisfactory results.

ROYAUME DU MAROC

MINISTÈRE DE L'AGRICULTURE
ET DE LA REFORME AGRAIRE

DIRECTION DE LA PROTECTION
DES VEGETAUX DES CONTROLES
TECHNIQUES ET DE
LA REPRESSION DES FRAUDES

N° 1869 D.P.U.C.T.R.F.I.P.V.I.1

المملكة المغربية

وزارة الفلاحة والاصلاح الزراعي

INFORM

مديرية وقاية النباتات

والمراقبات التقنية وزجر للغش

608-0196

رقم

RABAT, LE 11 9 OCT. 1992

LE DIRECTEUR DE LA PROTECTION DES
VEGETAUX DES CONTROLES TECHNIQUES
ET DE LA REPRESSION DES FRAUDES.

A

MONSIEUR CHARLES UPHAUS
CHEF DE LA DIVISION DE L'AGRICUL-
TURE ET DES RESSOURCES NATURELLES
USAID.

- RABAT -

OBJET : Projet lutte Antiacridienne
(N° 608-0196)
REF. : Votre lettre du 28 Sept. 1992.

ACTION : ANR
DUE DATE : 10/27
INFO : A/Dir - EXO (J.K.)
PROG - CHRON.

Suite à votre lettre, objet et référence cités en
marge, et après étude du rapport final du projet "lutte
antiacridienne", j'ai l'honneur de vous faire part de quelques
remarques sur le contenu de ce rapport :

a) - Dans l'introduction du chapitre I (page 1) la
mention "Sahara occidental" doit être corrigée en
précisant "Sahara marocain".

b) - Le chapitre IV (page 17), le paragraphe relatif
au Carbaryl fourni par l'USAID pour les traitements
au sol n'est pas clair.
Ce produit a été écarté car les résultats des essais
réalisés sur le terrain ont montré que son efficacité
n'était pas très satisfaisante.

c) - Le rapport reproche beaucoup au Maroc d'avoir
utilisé le DDVP pendant l'invasion acridienne.
Il faut cependant noter que le DDVP a été utilisé
lors des situations alarmantes pour anéantir
d'énormes essaims de criquets grâce à l'effet de choc
très élevé du produit. Il n'a, d'ailleurs été utilisé
que sur des zones désertiques non habitées.

BEST AVAILABLE COPY

Aussi, vous demanderais-je de bien vouloir reporter ces quelques remarques dans le rapport final du projet avant sa diffusion.

Veuillez agréer, Monsieur Uphaus, l'expression de mes salutations distinguées.

Le Directeur de la Protection
des Végétaux et des Techniques
et de la Repression des Fraudes

Abdelaziz ARIFI